ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING

CUTTYHUNK HARBOR

CUTTYHUNK, MASSACHUSETTS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.
02154

SEPTEMBER 1977

ENVIRONMENTAL ASSESSMENT

HYDRAULIC MAINTENANCE DREDGING

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AUGUST 1977

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1. PROJECT DESCRIPTION

1.1 Location and General Description. Cuttyhunk Island, off the southern coast of Massachusetts, is in the town of Gosnold, Massachusetts. Cuttyhunk Harbor is located on the eastern end of the island at the western entrance to Buzzards Bay, about 14 miles south of New Bedford Harbor, Massachusetts.

Cuttyhunk Island has an area of 700 acres and is the westernmost of the Elizabeth Islands, a chain of sparsely populated islands which extend southwesterly from Woods Hole, Cape Cod, and bound Rhode Island Sound at its eastern end. This island chain separates Buzzards Bay on the northwest from Vineyard Sound on the southeast. The small village at Cuttyhunk is located about 14 miles south of New Bedford and about 22 miles southwest of the Cape Cod Canal. The harbor serves as a refuge for small boats enroute from Long Island Sound, Buzzards Bay, Cape Cod Canal or Martha's Vineyard. Cuttyhunk Harbor consists of an exposed outer harbor at the northeastern end of the island and a sheltered inner harbor to the west that is nearly landlocked.

The outer harbor is protected by Nashawena Island to the east and by Canapitsit Island to the south, joined by a narrow barrier beach to the eastern end of Cuttyhunk Island. Partial protection is afforded by Penikese and Gull Islands, two small islands which lie

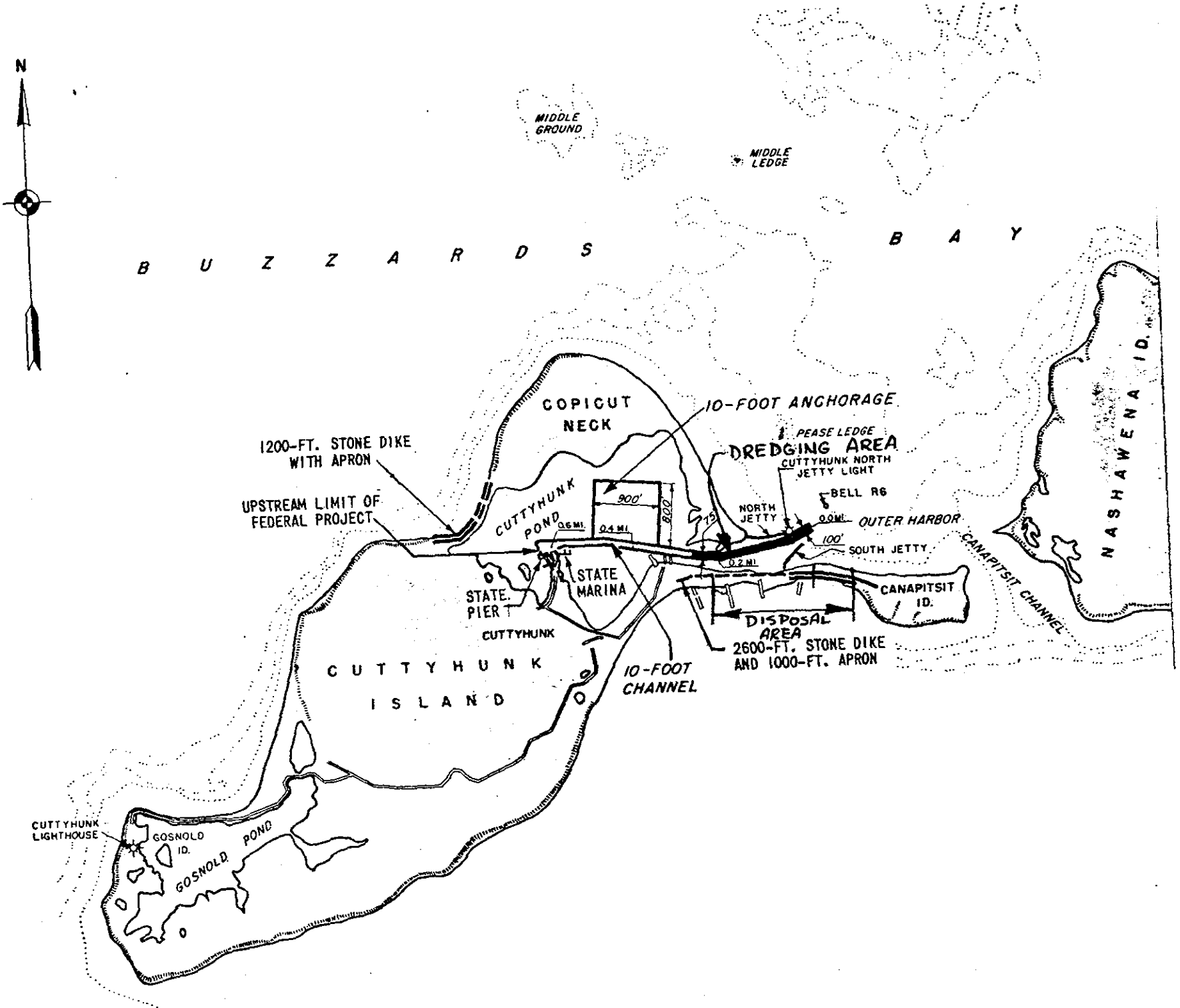

N
MIDDLE GROUND
MIDDLE LEDGE
B U Z Z A R D S B A Y
COPICUT NECK
10-FOOT ANCHORAGE
PEASE LEDGE
DREDGING AREA
CUTTYHUNK NORTH JETTY LIGHT
1200-FT. STONE DIKE WITH APRON
UPSTREAM LIMIT OF FEDERAL PROJECT
CUTTYHUNK POND
900'
800'
0.6 MI.
0.4 MI.
NORTH JETTY
BELL R6
0.0 MI.
OUTER HARBOR
100'
SOUTH JETTY
0.2 MI.
STATE MARINA
STATE PIER
CUTTYHUNK
CANAPITSIT ID.
DISPOSAL AREA
2600-FT. STONE DIKE AND 1000-FT. APRON
CANAPITSIT CHANNEL
NASHAWENA ID.
C U T T Y H U N K I S L A N D
10-FOOT CHANNEL
CUTTYHUNK LIGHTHOUSE
GOSNOLD ID.
GOSNOLD POND

FIGURE No. 1

about 1.3 miles to the north and north-northeast, respectively. The outer harbor has a usable area of about 50 acres varying from 10 to 16 feet in depth. There is considerable turbulence caused by tidal action through Canapitsit channel to the southeast and Buzzards Bay to the northeast and northwest.

The inner harbor has an area of about 100 acres, with depths from 1 to 14 feet. It is protected by Copicut Neck to the north, entrance jetties to the east, and by the main island to the southwest. Partial protection is afforded by a low spit between Copicut Neck and the north jetty, and by a narrow barrier beach with dikes to the west and south. The shoreline encompassing the inner harbor is for the most part undeveloped and consists of short gravel beaches that emerge from the waterline and change rapidly to scrub growth.

1.2 Existing Project. The existing Federal project at Cuttyhunk Harbor consists of:

a. A channel 10 feet deep and 75 feet wide from the outer harbor to the westerly terminal in the inner harbor (Cuttyhunk Pond). The length is approximately 3,500 feet.

b. An anchorage 10 feet deep and 16.5 acres in the inner harbor.

c. Two jetties which bound the entrance to the harbor.

d. A 1300-foot stone dike at the east end of Canapitsit Beach.

e. A 600-foot stone dike at the south end of Copicut Neck Beach.

1.3 Project Authorization. The following is a summation of the project authorization:

(1963) - Maintenance dredging of the project channel commenced in fiscal year 1963 and was completed by October 1962 with approximately 15,000 cubic yards of ordinary material removed. Removal of unclassified material was completed under separate contract in June 1963. Disposal of the dredged material was accomplished in part hydraulically with disposition being on the barrier beach connecting Cuttyhunk and Canapitsit Islands. Some material was also deposited at sea in Buzzards Bay.

(1950) - Maintenance dredging in the entrance channel to Cuttyhunk Pond commenced July 16, 1949 with 1,446 cubic yards of material removed. Dredging under a new contract commenced November 14, 1949 and was completed December 23, 1949 with 31,144 cubic yards removed. Construction of the initial unit of the barrier beach protection commenced August 17, 1949 and was completed November 3, 1949 with 74,800 cubic yards of fill pumped.

(1948) - Maintenance dredging commenced August 19, 1947 and was completed September 16, 1947. During the fiscal year 12,109 cubic yards of mud and sand were removed.

(1940) - Repairs to the north jetty by contract were in progress from July 16 to July 31, 1939.

(1939) Improvement dredging of the channel and anchorage began October 3, 1938 to January 13, 1939 with 251,120 cubic yards of material removed by hydraulic process. Between June 1 and June 9, 1939 - Babcock removed 112 cubic yards of boulders.

ACTS	WORK AUTHORIZED	DOCUMENTS
Aug. 30, 1935	Channel, anchorage & jetties	H. Doc. 81, 75th Cong. 1st Session
Design Memorandum Stone dikes December 27, 1963		Approved by the Office of the Chief of Engineers

1.4 Maintenance Dredging. Preliminary estimates indicate the need to remove approximately 10,000 cubic yards of sand from the entrance channel. The dredging will include excavation of pockets on either side of the major shoal areas as a preventative maintenance feature. A hydraulic pipeline dredge will be used to pump the material onto Canapisit Beach which protects the channel to the south towards Vineyard Sound. The disposal area is within 1,000 feet of the dredging area (Figure 1). Commencement of the work is tentatively scheduled for 1 October 1977.

1.5 Purpose of Maintenance Dredging. As a result of a hydrographic survey conducted in June 1975, following attempts to remove shoals by the sidecast method, the New England Division determined that further dredging was required in the 10-foot entrance channel. Shoaling has since reduced the depth in the channel to such an extent that in places there is only 4 feet available at mean low water. The dredging will restore the project dimensions to accommodate present navigation requirements.

1.6 Previous Dredging History. In 1954-1955 the Commonwealth of Massachusetts performed dredging of about 40,000 cubic yards for placement on the Canapitsit barrier beach. Construction and dredging action by the Army Corps of Engineers is summarized as follows:

2. ENVIRONMENTAL SETTING

2.1 Location of Project and General Description. Cuttyhunk Harbor is located near the eastern end of Cuttyhunk Island, which is the most westerly of the Elizabeth Islands. The Elizabeth Islands constitute the town of Gosnold, Massachusetts, and extend 14 miles southwesterly from Woods Hole, Cape Cod, Massachusetts, separating Buzzards Bay on the north from Vineyard Sound on the south. Cuttyhunk Harbor opens into Buzzards Bay and consists of an outer and inner section. The outer harbor has a usable area of about 50 acres varying from 10 to 16 feet in depth. It is afforded some protection from the south by Canapitsit Beach and Island, but is exposed to the north, with the exception of limited shielding offered by Penikese Island. The outer harbor connects with Vineyard Sound through Canapitsit Channel which lies between Canapitsit and Nashawena Islands, although Quicks Hole Channel to the east of Nashawena Island is preferred by navigators. The inner harbor, or Cuttyhunk Pond, covers an area of more than 100 acres with depths ranging from 1 to 14 feet below mean low water. A channel with an authorized depth of 10 feet heads between jetties from the outer harbor to a 16.5-acre 10 foot deep anchorage in the inner harbor. The inner harbor is well protected and the 10-foot anchorage provides good shelter, except during hurricanes. Cuttyhunk Harbor is located about 14 miles south of New Bedford Harbor, 14 miles southwest of Woods Hole Harbor, 22 miles southwest from the western end of the Cape Cod Canal, and 28, 30 and 35 miles east of the harbors at Newport, Point Judith and Block Island, Rhode Island, respectively.

1.7 Maintenance of the channel was last performed during 24 May - 11 June 1975 when approximately 5,724 cubic yards of material was dredged by sidecaster method. This particular dredging method proved to be unfeasible due to the fact that the material excavated could not be cast over the jetty or far enough upon the shores to prevent its washing back down into the channel.

and the other at the end of the turning basin called Fishermen's Pier. In addition, there is the small dock with floating platform owned by the Cuttyhunk Yacht Club and two or three other privately owned piers and the harbor marina. The marina consists of a 264' main pier and two 180' finger piers located east of Fishermen's pier in the inner harbor. Water and fuel are available at the public docks throughout the year. There are no boatyards or major repair facilities at Cuttyhunk, as most of the local fishermen accomplish their own repair work or have such work done at New Bedford. Furthermore, since pleasure craft use Cuttyhunk Harbor primarily on transit or for refuge, no demand exists for repair facilities. However, the town has a marine railway adjacent to Fishermen's Pier for use by local residents and for emergency haul outs.

Commerce in Cuttyhunk Harbor is limited to building materials, bulk supplies, machinery, general merchandise and other necessities of life for the population of the island, and for servicing local and visiting craft. Practically all fish caught by the local fishing fleet is transported to New Bedford. Fuel brought in amounts to about 50,000 gallons of gasoline and 60,000 gallons diesel oil annually.

Commercial vessel traffic in the harbor includes 11 trips annually by barge and tug for fuel transport. The mailboat makes scheduled daily trips from June to September and twice weekly the remainder of the year bringing passengers, freight and supplies from New Bedford. The mailboat and other freight vessels make about 25 additional trips bringing in building materials, bulk supplies, machinery, etc.

2.2 Tidal Information.

Table 2

Tide Data, Cuttyhunk Harbor, Massachusetts
(in feet)

Mean Tide Range	3.4
Mean Spring Tide Range	4.2
Mean High Water (MHW)	3.4
Mean Sea Level (MSL)	1.7
Mean Low Water (MLW)	0.0

2.3 Project Usage and Facilities. Cuttyhunk Island is the principal population center of the town of Gosnold, the other Elizabeth Islands being practically uninhabited. The permanent population varied from about 60 in 1936 to 136 in 1940, to 56 in 1950 and to 66 in 1960. The population is greatly increased during the summer by summer residents, vacationists and tourists. The principal occupations of the area include fishing, lobstering, and the entertainment of summer visitors, including a large number of transient yachtsmen and other boat owners. Cuttyhunk lies close to the route traversed by boats using the Cape Cod Canal, Buzzards Bay and Vineyard Sound, and is used for night stop-over by boats sailing from Long Island Sound to the Cape Cod Canal.

Continued maintenance of the harbor is vital to the inhabitants of the island and of value to summer residents and visitors. In addition to the Coast Guard boat house and dock, there are two town owned public wharves; one just inside the inner harbor called Town or Mailboat Dock;

During 1974 the following commerce was reported for the harbor:

DRAFT RANGE	VESSEL TRIPS	COMMERCE (TONS)
7-8	962	260
6-7	212	100
5-6	230	125
others	2,878	324
Totals	4,282	809
	Total Passengers	7,864

The principal items of commerce are petroleum products and staple goods needed by the residents.

Major industries on Cuttyhunk are fishing, lobstering and tourism. A State operated pier and marina provide berthing for an estimated 75 boats, having lengths of 20 to 50 feet.

Recreation Use:

DRAFT RANGE	VESSEL TRIPS
7-8	1,850
6-7	3,250
others	12,000
Total	17,100

2.5 Geology. Cuttyhunk Island is of glacial origin and part of the Buzzards Bay marine ridge deposit system (Strabler 1966). It is probable that the barrier beaches forming the perimeter of the inner harbor are spits or tombolos formed through erosion of higher ground on Cuttyhunk, Copicut Neck and Canapitsit Island. Materials on the island comprise sand, gravel and boulders. Erosion of the bluffs around the island is currently resisted somewhat by the natural armor

Most of the fishing and pleasure boat traffic takes place during the summer months from June to September. Reports prior to extension of Fishermen's Pier in 1959 indicated that about 20 boat owners used the facilities regularly, and although about 50 average-size boats could be accommodated comfortably, about 100 boats were docked during the swordfish tournament.

Records of overnight tie-ups of pleasure craft in 1962 show 139 in June, 446 in July, 350 in August, 182 in September and 39 in October, or a total of 1156 boat tie-ups from June to October 1962. In addition to boats docked at the available harbor facilities, a number of boats stay in the 10-foot anchorage. During the summer season about 50-60 boats daily on weekdays and about 100 boats daily on weekends use the harbor for a stopover, as it is conveniently situated on the route from Long Island Sound to the Cape Cod Canal. It is also reported that the inner harbor is occasionally filled to capacity and a number of boats stay at anchor in the outer harbor.

2.4 Benefits to be Provided by the Project - Navigation. Dredging of the channel will enhance the use of the harbor and reduce the chance of groundings. Starting in the winter of 1976, a new barge which is 50 feet wide and draws 10 feet began delivering fuel oil to the island. Since the channel is only 75 feet wide, the barge will utilize the full channel width especially at the bends in the channel. A ferry out of New Bedford which draws 8 feet serves the island on a daily basis in the summer and twice a week in the winter.

2.7 Fisheries. A wide variety of schooling fish frequent the waters of the Vineyard Sound and Buzzards Bay where they feed and spawn. Spawning concentrations of herring, Clupea harengus, shad, Alosa sapidissima, alewives, Alosa pseudoharengus and mackerel, Scomber scombrus form during the spring and may be observed in their migrations to coastal waters north of Cape Cod. Other schooling fishes such as scup, Stenotomus verisicolor, butterfish, Poronotus triacanthus, bonito, Sarda sarda, bluefish, Pomatomus saltatrix, and striped bass, Marone saxatilis also occur on a seasonal basis and in frequent numbers. Often large schools of several species are encountered together at times in the shallow waters around the Cape and offshore islands. The tuna, Thunnus thynnus swordfish, Xiphias menidia and the white marlin, Makaira albida may occur sporadically either in pursuit of baitfish (e.g. menhadem Brevoortia tyrannus, or silversides, Menidia menidia) or simply as a result of migration meanderings. Usually, however, these larger game fish are caught further offshore.

Forty-one species of fish were recorded from trawl surveys conducted over a sixteen month period in Great Harbor, Woods Hole (Lux and Nichy, 1971). The catch represents the more common species known to occur in Cape and island waters and their abundances are correlated with temperature data. Cunners, juvenile sea bass, fourspine stickback, flounder and pipefish were seen while SCUBA diving in the project channel.

Recreational salt water fishing at Cuttyhunk is extremely well developed. Sportfishing occurs for striped bass, bluefish, cod, pollock, tautog and flounder. Striped bass and bluefish are the most important sportfishes for the island and constitute an important segment of the sport fisheries in coastal waters of Southern New England as well. The annual Martha's Vineyard and Cuttyhunk Striped Bass and Swordfish Derby is a major source of income for the resident populace.

of boulders and rock remaining from previous erosion. The barrier beaches are generally composed of small stone and gravel. Nothing is known of the local natural drift or sediment transport dynamics. There is transportation of sand into the existing channel but factual information with regard to rates, direction, or sources is lacking.

2.6 Hydrology and Water Quality. A field report submitted by a representative of the Massachusetts State Public Health Service, November 1967 stated that:

"Most of the houses on the island are tied into the town sewer which has its outfall on the southeast end of the island. One pipe was found going into the pond (harbor) which carried raw sewage. It was said also that there were three or four septic tank overflows which empty into the pond but none were seen.

During the summer months the harbor is said to be filled with yachts which discharge raw sewage into the pond. Samples during the summer would indicate most severe peak coliform conditions."
State and Federal Public Health Service Shellfish biologists accompanied Corps biologists on a survey in May 1977 to collect water and quahog samples for bacterialogical analysis.

During the summer peak boating months total fecal coliform levels may be expected to increase drastically. This contamination was found to be transient in the case of Sippican Harbor (Moore and Moore, 1974). Because of the constricted entrance channel at Cuttyhunk Harbor, and consequent poorly flushed waters, the intensity and duration of bacterial pollution may be greater.

such as cod, haddock and eelpout, the winter months stimulate feeding or spawning concentrations in deeper waters.

Our knowledge of the fishes inhabiting Cuttyhunk Harbor are limited to only SCUBA observations. Seine, trawl and diving surveys conducted on a seasonal basis would provide considerable more knowledge on the nursery and food source potential for fishes. At this time Cuttyhunk Harbor appears to hold considerably less value as a fishery than Tashmoo Pond or Menemsha Creek.

2.8 Endangered Species and Archeological Resources. There are no known species of marine organisms inhabiting Cuttyhunk Harbor or channel which are not also found elsewhere; that is, most of the fishes and invertebrates occurring in the project environs are distributed along much of the Atlantic Coast. Therefore, periodic maintenance activities or environmental perturbations in the boat basin or channel will not threaten long-range survival of any local species.

The project comprises neither properties listed in the National Register of Historic Places nor properties under consideration for nomination to the National Register. Further, the site has no known archeological resources and prior excavations have not turned up any artifacts.

Penikese Island located to the north in Buzzards Bay provides breeding and nesting habitat for terns, petrels and various other coastal bird species. The island also holds some historic value as being the site for the first marine science laboratory established in the United States.

Flounder is also a valuable coastal resource to both sport and commercial fisheries interests. Winter flounder, Pseudopleuronectes americanus are usually found in the Bay and Sound in varying numbers year round. This species breeds and spawns during the winter or early spring. Large concentrations have been observed in Tashmoo Pond and many adults and juveniles were noticed at Menemsha during past SCUBA surveys. Summer flounder or fluke are said to be making a comeback in the Sound. This species generally exhibits a preference for sandy bottoms, but it may be taken over a variety of sediment types. Spawning usually takes place offshore, but the young, like many fish species, seeks the protection of tidal creeks and ponds.

A small fishery for scup, Stenotomus chrysops exists in the Sound. Scup congregate in schools and migrate inshore in early April with spawning taking place from May through August. Trawl lines (exact numbers unknown) for cod are also fished on a year round basis. Generally speaking, fish numbers are too small to support an industrial trash fish fishery of any size. The Marine Biological Laboratory obtains trawl collections of sculpin, flounder, sea robins, skates and various invertebrates for shipment to educational and research institutions. Similar collections are made also by the Marine Aquarium, of the National Oceanographic and Atmospheric Administration (NOAA) Woods Hole.

The fishing season extends from May through November. By November or with the first abrupt changes in water temperature the majority of schooling fishes have begun their southward migration or moved offshore to deeper water. This movement to deeper water is referred to as the overwintering migration. For some species, particularly demersal fish

2.9 Sediment Analysis of the Dredge Site. In July 1976 the Corps of Engineers conducted a core sediment sample analysis at Cuttyhunk Harbor. The location of these samples is shown in Figure II.

A physical description of these samples is found in Table II and gradation curves are found in Appendix I. Concentrations of metals and organics generally show an increase with increasing distance from the entrance channel into the pond as might be expected. Decomposed eelgrass and algae have accumulated on the bottom in the inner portion of the channel and anchorage basin. As a result of the decomposition of this material the sediment at some locations are permeated with hydrogen sulfide.

Most sediment is composed of clean sand with the exception of those stations located within the anchorage or inner channel areas. Sample stations GE-2 and GE-3 are within the channel portions proposed to be dredged.

Table III contains results of chemical analysis for all sediment samples. Refer to Figure II for sample locations.

2.10 Benthos and Shellfish Resources. Specific studies on the invertebrate animal communities in Cuttyhunk Harbor are lacking. However, Corps Biologists of the Environmental Analysis Branch have collected grab samples over the last two years. Preliminary analysis of the samples show the dominant organisms to include the bivalves Solemya velum, Tellina agiles and Tellina versicolor, and Gema gema. Gastropod species include Mitrella lunata, Anachis sp; Chlichna alba, and Nassarius trivittata. Crustaceans are represented by the hermit crab Pagurus annulipes, and mud crab Neopanope sayi, cumacean Leucon americanus and various amphipod species. The inner

Table I

FISHES OF GREAT HARBOR,
WOODS HOLE, MASSACHUSETTS
(Lux and Nichy 1971)

Mustelus canis, smooth dogfish

Raja erinacea, little skate

Raja ocellata, winter skate

Alosa pseudoharengus, alewife

Brevoortia tyrannus, Atlantic menhaden

Osmerus mordax, American smelt

Trachinocephalus myops, snakefish

Auguilla rostrata, American eel

Fundulus heteroclitus, mummichog

Fundulus majalis, Striped killifish

Merluccius bilinearis, silver hake

Microgadus tomcod, Atlantic Tomcod

Pollachius virens, pollock

Urophycis chuss, red hake

Urophycis tenuis, white hake

Apeltes quadracus, fourspine stickleback

Gasterosteus aculeatus, threespine stickleback

Syngnathus fuscus, northern pipefish

Centropristes striatus, black sea bass

Pristigenys alta, short bigeye

Menticirrhus saxatilis, northern kingfish

Mullus auratus, red goatfish

Stenotomus chrysops, scup

Tautogolabrus adsporsus, cunner

Tautoga onitis, tautog

Gobiosoma ginsburgi, seaboard goby

Prionotus carolinus, northern searobir

Myoxecephalus octodecemspinosus, longhorn sculpin

Dactylopterus volitans, flying gurnarc

Pholis gunnellus, rock gunnel

Poronotus triacanthus, butterfish

Menidia menidia, Atlantic silverside

Paralichthys dentatus, summer flounde

Scophthalmus aquosus, Windowpane flounder

Pseudopleuronectes americanus, winter flounder

Monacanthus hispidus, planehead filefishes

Lophius americanus, goosefish

CUTTYHUNK HARBOR

1975

SEDIMENT ANALYSIS

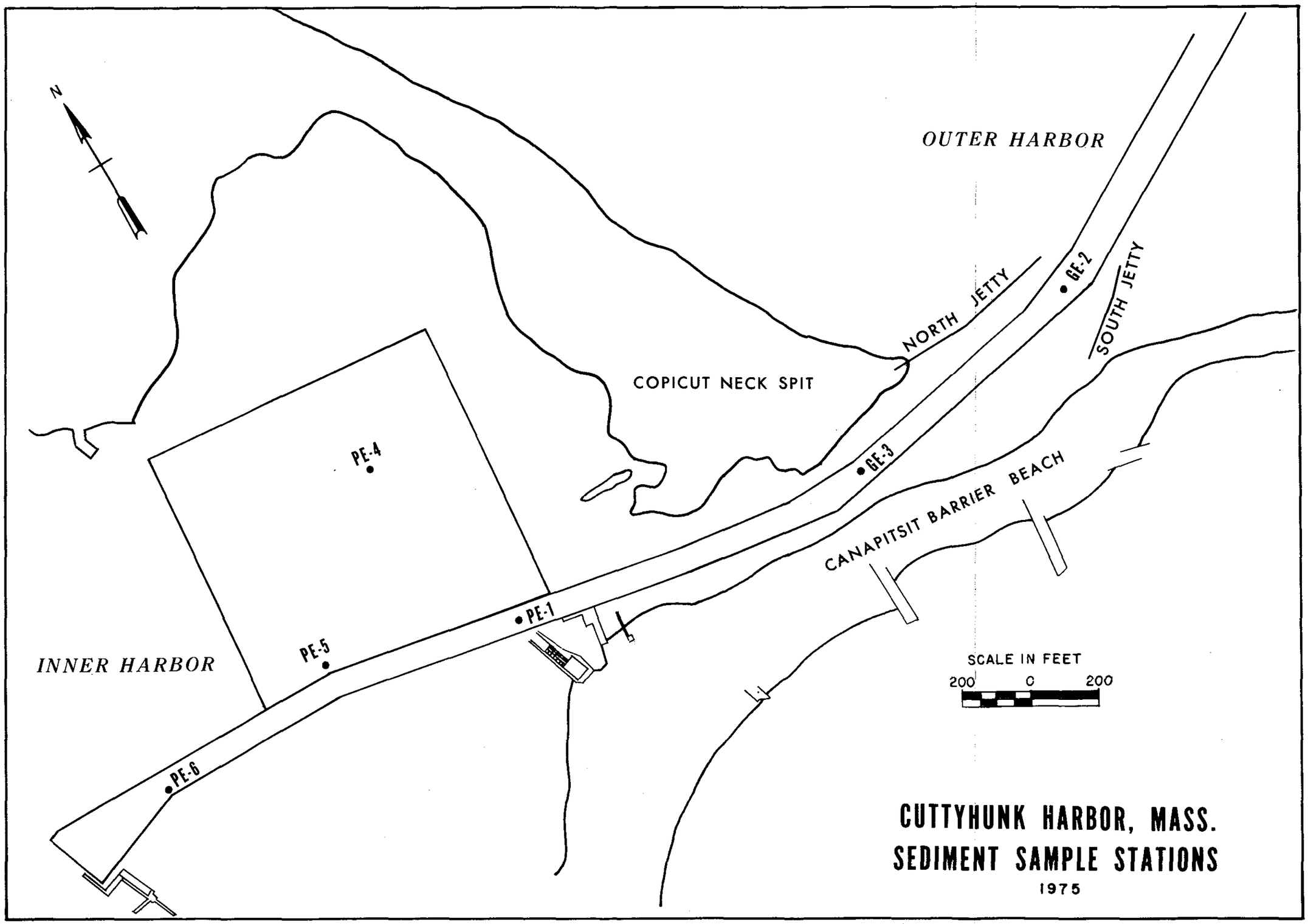
Parameters	PE-1 Grey Silty fine-sand and fine sand	GE-2 Grey fine sand	GE-3 Tan fine sand	PE-4 Dark grey fine sandy organic silt to grey silty sand	PE-5 Black fine sandy organic silt and grey silty fine sand w/shell fragments	PE-6 Black fine sandy organi silt
Grain Size (med)	0.170	0.190	0.230	0.049	0.023	0.018
Vol. Solids - EPA	2.76 (2.38)	0.45	0.37	6.16 (1.31)	5.93(3.22)	7.54(4.09)
NED	2.00	0.29	0.21	4.66	4.79	5.91
C.O.D.	3.39	0.282	0.785	7.98	7.81	9.71
T.K.N.	0.136	0.016	0.006	0.267	0.250	0.326
Hex. Sol. - Oil & Grease	0.060	0.008	0.018	0.087	0.044	0.107
Hg x 10^{-5}	4.5 (10.4)	0.26	0.00	5.1 (0.56)	5.7 (0.89)	6.4(5.4)
Pb x 10^{-3}	2.5 (3.9	1.3	0.51	3.5 (0.00)	5.1 (1.8)	7.8 (3.9)
Zn x 10^{-3}	5.1 (5.0)	1.5	0.77	8.3 (1.9)	8.4 (2.5)	10.6 (6.8)
As x 10^{-3}	0.25 (0.21)	0.06	0.03	0.57(0.24)	0.47 (0.13)	0.45(0.38)
Cd x 10^{-3}	0.09 (0.17)	0.08	0.08	0.26(0.08)	0.28 (0.21)	0.34(0.11)
Cr x 10^{-3}	1.5 (1.7)	0.50	0.51	3.5 (0.81)	3.7 (1.4)	4.5 (2.9)
Cu x 10^{-3}	4.6 (7.0)	1.3	0.26	4.8 (1.4)	4.0 (1.8)	5.0 (3.9)
Ni x 10^{-3}	4.3 (3.1)	1.3	1.3	4.8 (1.4)	2.3 (0.71)	2.8 (0.72)
V x 10^{-3}	1.2 (2.7)	1.3	1.3	4.4 (1.4)	2.3 (1.9)	5.6 (5.4)

Values are expressed as % dry weight of sample

TABLE II

Physical Description of Sediment

	0.17' - 1.0'	0.0' - 0.17'
PE-1	Grey Silty, Fine Sand (SM w/Marine Odor	Dark Grey, Fine Sandy
	Surface	
GE-2	Gray Fine Sand (SP) w/Marine Odor	
	Surface	
GE-3	Tan Fine Sand (SP) w/Marine Odor	
	0.0' - 0.7'	
PE-6	Black Fine, Sandy Organic Silt (OH) w/Marine Odor	


N
OUTER HARBOR
NORTH JETTY
SOUTH JETTY
GE-2
COPICUT NECK SPIT
PE-4
GE-3
CANAPITSIT BARRIER BEACH
PE-1
PE-5
INNER HARBOR
PE-6
SCALE IN FEET
200 0 200
CUTTYHUNK HARBOR, MASS.
SEDIMENT SAMPLE STATIONS
1975

harbor mud substrate is dominated by the bivalve Nucula proxima and polychaetes including Capitella capitata. The presence of this latter specie is often associated with sediments characterized by high organic content.

Earlier surveys by Verrvill and Smith (1873) and Sumner et al (1911) describe the distribution and general ecology of several benthic organisms taken in Vineyard Sound and Buzzards Bay. Schopf (1974) has researched the reproduction and genetic variability in the bryozoan specie Schizoparella found in Cuttyhunk Harbor. Parker (1969) has identified different habitat types, based on animal-sediment relationships and physical parameters, characterizing Hadley Harbor which is located at the opposite end of the Elizabeth Island chain. The tidal channel, soft bottom lagoon center and eel grass-sand substrate are similar to existing conditions observed at Cuttyhunk.

Commercially important shellfish species are found in the project and are limited to the quahog Mercenaria mercenaria. This hard clam is taken by island residents during winter and spring months but the population numbers do not support commercial scale harvesting. Lobstering is conducted all around the island and a few small lobsters may be taken along the rocky shores of Canapitsit Island and the extreme tip of the jetties. The Massachusetts Department of Marine Fisheries (letter 20 Jan. 1975) has conducted lobster tagging studies in the vicinity of Sow and Pigs Reef situated at the southern end of the island.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

The proposed project will not alter the present use of lands surrounding the harbor. The barrier beach which will be used as a disposal area is a sand spit which is washed over during storms and it has been disposed on in the past. This land is only a few feet above MHW and therefore too vulnerable to storms to use for any other purpose. The rocky nature of the beach preclude its use as a prime bathing area.

4. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

4.1 Beneficial. The principal benefits derived from the existence and maintenance of the navigation project at Cuttyhunk are based on its value and use as a harbor of refuge. Cuttyhunk Harbor is favorably situated in relation to traffic passing through the Cape Cod Canal and Vineyard Sound. It is used extensively as a harbor of refuge by pleasure craft during the summer months and by fishing vessels and other craft throughout the year. It is also used for night stopover by small boats sailing from Long Island to the Cape and islands. It is the only harbor of refuge on the south side of Buzzards Bay. At times of approaching hurricanes, and during hurricanes when the navigation gates at the New Bedford Barrier are closed, the nearest harbors where small craft can seek refuge are Cuttyhunk and Menemsha Creek. The proposed dredging action ensures safe passage into Cuttyhunk Harbor.

4.2 Impacts of Dredging. Dredging will remove and alter the substrate used by various esturine biota. The area most affected will be that covered by the path of the hydraulic dredge. Specific impacts related to sidecast dredging at Cuttyhunk were discussed by Chase (1976). Hydraulic dredging impacts associated with maintenance dredging in Georgia estuaries are described by Stickney (1973). Areas outside the dredge path will be affected somewhat by the suspension and disposition of dredged materials during dredging operations. Any motile biota present at this time will move into adjacent water; thus impacts

to this group will be minor. As the material to be dredged is primarily fine sand, settling will be rapid in comparison to silts. Other materials left in suspension will be diluted by tidal currents, offsetting any potential problem that might result from suspended solids.

In addition to the obvious quantitative impact of turbidity, chemical elements in sediment may produce various qualitative effects on water quality. These include nutrient input, and release of heavy metals. Nutrients, the concentration of which normally is limiting to phytoplankton growth, if released in sufficient quantity may cause phytoplankton blooms. These materials are mainly phosphates and nitrates. The precise amounts of nitrogen and phosphorus, and their ratio, which would be sufficient to cause phytoplankton blooms have not been determined. Although a predictive model for nutrient input from sediment is not available, there are isolated studies on the effects of nutrient inflex as a result of dredging. Martin and Yentsch (1973), in an evaluation of the effect of dredging in the Annisquam River, found that no detectable change in nutrient content could be attributed to dredging. It was suggested that the relatively small volume of water involved was an explanation. The lack of data regarding flushing rates and tidal exchange volume precludes prediction of whether or not the dredging will cause phytoplankton blooms in Cuttyhunk Harbor. Preliminary current measurements obtained in April and May 1977 showed the channel velocities to be relatively sluggish and flushing will require a longer period of time than that associated with riverine environment.

Further, in a study on the release of heavy metals by Army Corps of Engineers' Mississippi Waterways Experiment Station it was found in general for long term tests (months) that trace metals were released into the water in the subparts to parts per billion range. As present levels of heavy metals in sediment samples are not high, an increase on the order of PPB should not cause any adverse impact.

Organic material can result in a depletion of dissolved oxygen. This is referred to as a biological oxygen demand. As respiration by microfauna requires oxygen, a lowered D. O. may result. However, it is unlikely that this condition would develop at Cuttyhunk for two principal reasons. Dredged material volume amounts to only approximately 10,000 yd^3 of which only a small portion contains organics. In addition, the ratio of dredged material to volume of sea water is very small; thus dilution should eliminate any potential problem.

4.3 Impacts of Dumping. Environmental impacts can be described in two aspects: those connected with burial at the disposal site and impacts presented from leachate runoff from the beach back into marine waters. As the material is primarily clean sand, disposal should not impart a long-term impact to the present environment; it is physically similar to material that it will cover. Therefore, biota such as polychaetes, amphipods and isopods will recolonize the new sand quickly. Some of the sediment to be dredged from that section of the channel off Copicut Neck Spit does contain organics in the form of decayed algae and eelgrass which will present a foul hydrogen sulfide odor upon exposure. However this smell will be of short-term existence, persisting until such time as an aerobic environment is established.

As material from hydraulic dredging will not be confined, leaching will occur from the beach. According to Windom (1972), leachate will contain high levels of ammonia. An increase in ammonia may bring about a rapid increase in the phytoplankton and benthic algae communities in the area near the beach. However, due to the small portion of material containing organics from which NH_3 will originate, and periodic tidal flushing, a serious impact is not expected. At worst, it would result in a temporary bloom of small magnitude. Any increase in ambient heavy metal concentrations will also be small.

5. PROBABLE ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

5.1 There will be several adverse Environmental Impacts which cannot be avoided. Those associated with dredging include the disruption and removal of biota in the path of the hydraulic dredge, turbidity, and introduction of heavy metals and organics. Previous discussion led to the conclusion that although these impacts will be present they should not be of major significance.

5.2 Impacts associated with disposal on the barrier beach include burial of fauna, and leaching. As spoil material is mainly clean sand, repopulation should be quick. Leaching may cause temporary small phytoplankton blooms and elevated levels of heavy metals adjacent to the beach. However, wave action and tidal flushing should mitigate any such problem. Initially, there will prevail a foul odor with some dredge material but this will persist only until an aerobic environment is established.

5.3 Failure to maintain the Cuttyhunk Federal navigation channel will eventually mean the closing of the harbor. The harbor is vital to passing recreational and fishing craft owing to its use as a harbor of refuge. Eventually the services of the ferry and fuel barge will be hampered as the entrance channel continues to shoal. These services are critical to the subsistence of the islanders. The ferry, because of its operation on a fixed schedule, must sometimes enter the harbor during periods of low water.

6. ALTERNATIVES TO THE PROPOSED ACTION

6.1 Two major problems confronting dredging projects are the economic cost involved and determination of a location for deposition of spoil materials. The Army Corps of Engineers is responsible for maintaining all navigation projects which it originally planned and constructed. Maintenance must be conducted as long as the project receives use but only within those limits under which the project was originally authorized by Congress in accordance with Federal Law.

Dredging

6.2 No Action

An alternative to undertaking the proposed maintenance dredging in Cuttyhunk Channel is to allow shoaling to continue unabated. Adverse effects associated with dredging and disposal operation would be avoided but safety and economic benefits provided by the project would not be realized. The immediate implications of a "No Action" policy or even temporary postponement of dredging are continued groundings, possible collisions in the narrow channel and overall reduction of facility usage for anchorages or refuge. The policy of "no action" undoubedly represents the least desirable of alternatives to contend with but nevertheless must be considered. However far fetched the long or short-term consequences may seem, it must be realized that indifference to project maintenance would likewise produce environmental impacts through perpetuation of existing adverse conditions.

6.3 Alternative Dredging Methods

6.4 Oftentimes at public hearings or in reply to written environmental statements, questions arise as to which dredge method is least environmentally damaging. There is no known dredge which can operate without creating some environmental disturbance. From the viewpoint of man's environment, however, dredging is still a necessity.

6.5 Basically, four dredging methods are used in the maintenance of New England rivers and harbors. They are the hydraulic, bucket, (clamshell, orange peel or dipper) dredges, sidecast, and hopper dredge.

6.6 The hydraulic dredge operates on a vacuum principal and consists essentially of a centrifugal pump which draws in a mixture of water and sediment. The material is discharged through a pipeline system to either a land area or a barge.

6.7 Impacts often cited with regard to hydraulic dredging include: (a) temporary obstruction to navigation caused by extensive pipeline systems, (b) saline water pumped ashore could adversely affect ground water conditions and vegetation and (c) offensive odors from the decomposition of highly organic material. The hydraulic dredge, as is the case with vitually all dredge types, disrupts the bottom habitat, damages or kills benthic organisms, and releases sediments which might reduce D.O. levels at the sediment-water interface. Hydraulic dredging and subsequent land disposal, depending on the project, could require several acres of land. The disposal areas must also be relatively close to the dredging operation.

6.8 Unlike the hydraulic dredge, the bucket method requires auxillary disposal logistics, namely, barges or dump scows. The number of dredges and scows employed depend on the project size and distance to disposal site.

The bucket dredge is capable of operating in shallow or deep water, and hard or soft sediment. Disposal barges used are generally either bottom - dump or deck type. The bottom dump barges, as the names implies, are designed with hinged doors in the bottom. When the doors are opened, the material drops out in a concentrated mass. Disposal by this method requires less time and creates less visible water-surface effects then the deck type barge. Unloading the deck barge is generally accomplished using a hydraulic water jet which produces large turbidity plumes and disperses the material over a greater surface area.

6.9 The sidecast dredge FRY is a seagoing vessel with an overall length of 31 meters and a beam of 9 meters. The FRY is one of three U.S. Army Corps of Engineers owned and operated sidecast dredges operating in the United States. Each year the dredge is deployed on a loan basis to the New England Division from its home port in Philadelphia. The vessel is designed to draw only two meters draft when fully loaded which facilitates its negotiation in shallow channels and inlets. The dredge is extremely maneuverable and is capable of executing a complete turn almost within its own length. Being self-propelled, the sidecaster can work in conditions under which conventional plant would be imperiled or immobilized. The suction pipes, as with a hopper dredge, are positioned near midship on both port and starboard sides and are equipped with a drag head or suction grate approximately one meter in width.

6.10 The dredging process is carried out by vacuuming sediments and casting the material to within 30.5 meters (100 ft.) of the dredge through a 30cm diameter discharge pipe. The discharge boom is approximately 24.4 meters in length and mounted on a turret which enables it to be swung to

either side of the ship. A speed of three knots has been found to be optimum for dredging. The daily performance capacity of the unit is estimated at 1500 to 1800 cubic yards with a realized pumping capability of 330 cubic yards of sand per hour. The maximum depth for dredging efficiency is 6.1 meters (20 ft.).

6.11 This dredging method is intended for use in entrance channels only on an annual or bi-annual basis depending on the shoaling rate. The last maintenance action at Cuttyhunk, conducted in 1975, utilized this particular method.

6.12 Hopper dredging also involves a seagoing vessel. This type of plant, as with the sidecaster, pumps material from the bottom but stores the sediment in hoppers within the vessel, and then transports it to an ocean disposal site. Hopper dredges generally exceed 200 ft. in length and have drafs too deep to be accomodated by the existing Cuttyhunk channel.

6.13 Disposal of Dredge Material

6.14 Land Disposal Sites

Past maintenance of the project was accomplished by hydraulic dredging with the bulk of the spoils being pumped to the dike area connecting Copicut Neck to the main island and along the south beach. As previously mentioned, this dredging method is feasible providing suitable land sites, close enough to the project and of sufficient size to accept all of the material can be secured. This barrier beach area is a very favorable site for disposal of the inlet sands and is proposed to be used in the present project. Periodic nourishment will act to stabilize the beach which is vital to the protection and ultimate longevity of the channel.

Ocean disposal is not contemplated in connection with the present project. This option was considered in the early planning states. However, the benefits associated with replenishing the barrier beach led to the conclusion that disposal on the beach is the best course of action.

7. RELATIONSHIP BETWEEN SHORT TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG TERM PRODUCTIVITY

7.1 Continued maintenance dredging of the channel will insure the usefulness of the harbor in its present capacity. Viewed in a time frame of decades rather than years, this project action constitutes a short-term gain in the use of the island for recreational pursuits and economic benefits. Safe boating and commercial transport conditions will result in continued attractiveness of the island for tourists, recreational boaters and sport fishermen.

7.2 The long-term natural biological productivity of the project will not be affected significantly. Marine organisms were observed to quickly repopulate the submerged impact area after the last dredging in 1975. Since the material will be desposited on similar substrate, the beach habitat which presently exists will only be temporarily altered and species diversity and population densities of benthic sand-dwelling invertebrates should return to natural levels within a year's time or less.

8. IRREVERSIBLE AND/OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

8.1 Irreversible and/or irretrievable commitments of resources include the following: disruption and removal of biota on the beach and in the channel, and loss of labor and capital required to complete the construction work. Impacts to biota at both the barrier beach and the Cuttyhunk Pond Channel are expected to create no greater stress on plant and animal populations than are known to occur in natural seasonal fluctuation of species numbers.

9. COORDINATION

9.1 The proposed dredging project at Cuttyhunk Harbor has been discussed both verbally and in written communications with various local interests and State and Federal regulatory agencies. Copies of this assessment report will be made available to those persons and agencies with interest or regulatory responsibilities pertaining to dredging/disposal activities. Questions and comments related to the contents of this report and the proposed plans should be addressed to the Environmental Analysis Branch, New England Division, Corps of Engineers.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

June 22, 1977

Mr. V. L. Andreliunas
Chief, Operations Division
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Mr. Andreliunas:

We have reviewed your proposal for dredging Cuttyhunk Harbor in October 1977. Your office has indicated that the historical use of the dredged material is to nourish the beach and protect the inlet channel. Therefore, the dredged material and beach material are very similar in nature.

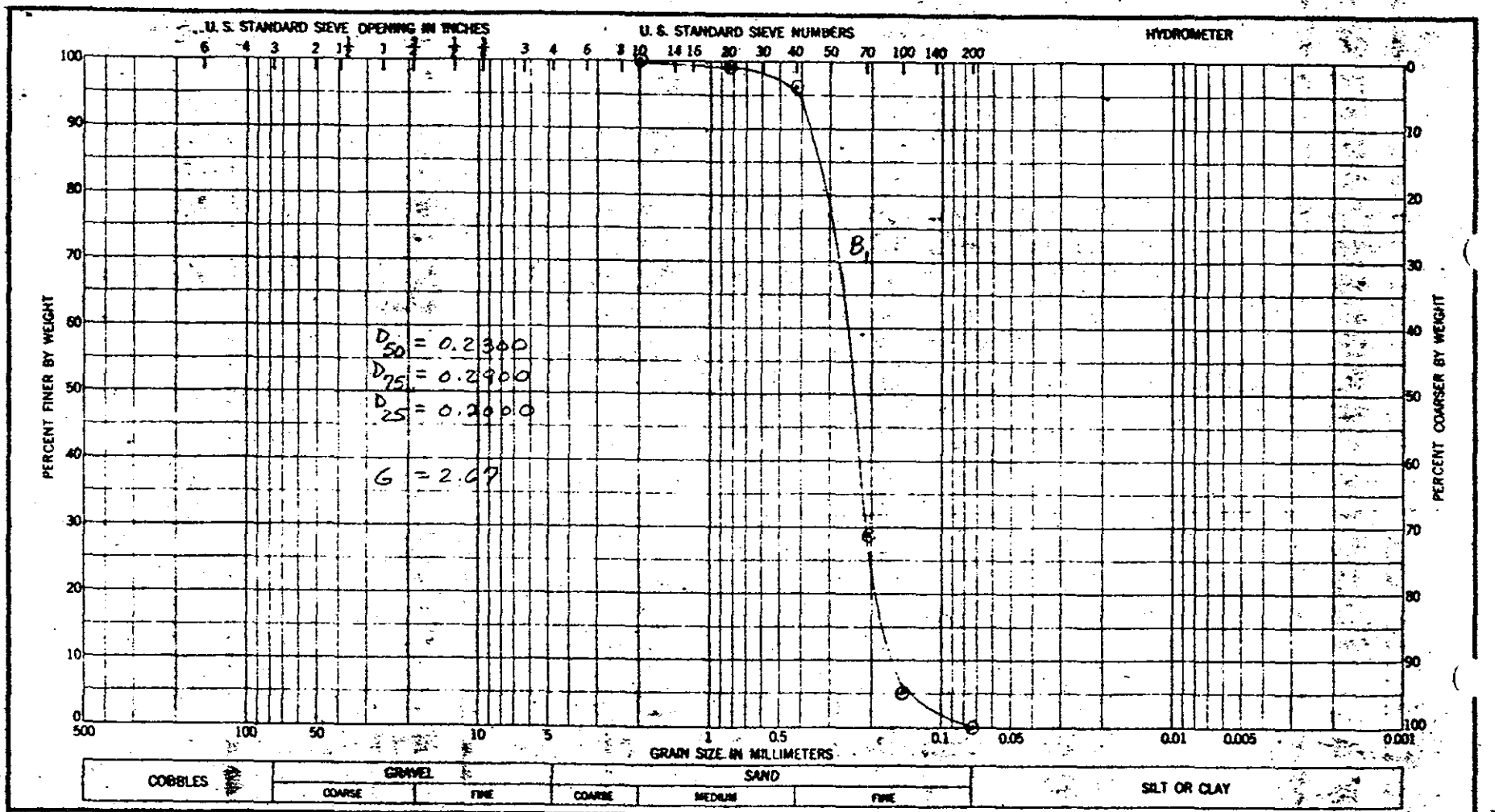
Since this is a land disposal project, the proposed work will be reviewed under Section 313 and 404 of the Federal Water Pollution Control Act and 40 CFR 230. The ocean dumping regulations of January 11, 1977, are not applicable to this proposed beach restoration work.

The project as represented by your office appears to meet criteria for material to be used for beach restoration, Section 230.4-1. An elutriate test should be performed to ensure that the chemicals associated with the sediment will not solubilize with the supernatant causing local water quality violations during the dredging operation.

If you have any questions, contact me at 223-5033.

Sincerely yours,

T. E. Landry
Ocean Disposal Coordinator
Permits Branch



Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI
B1	Surface	Fine SAND (SP)				

GRADATION CURVES

Project: Cuttyhunk Harbor, Mass.

Area:

Boring No. GE-3 (Lab Ser No. 100-229-1)

Date: May 1976

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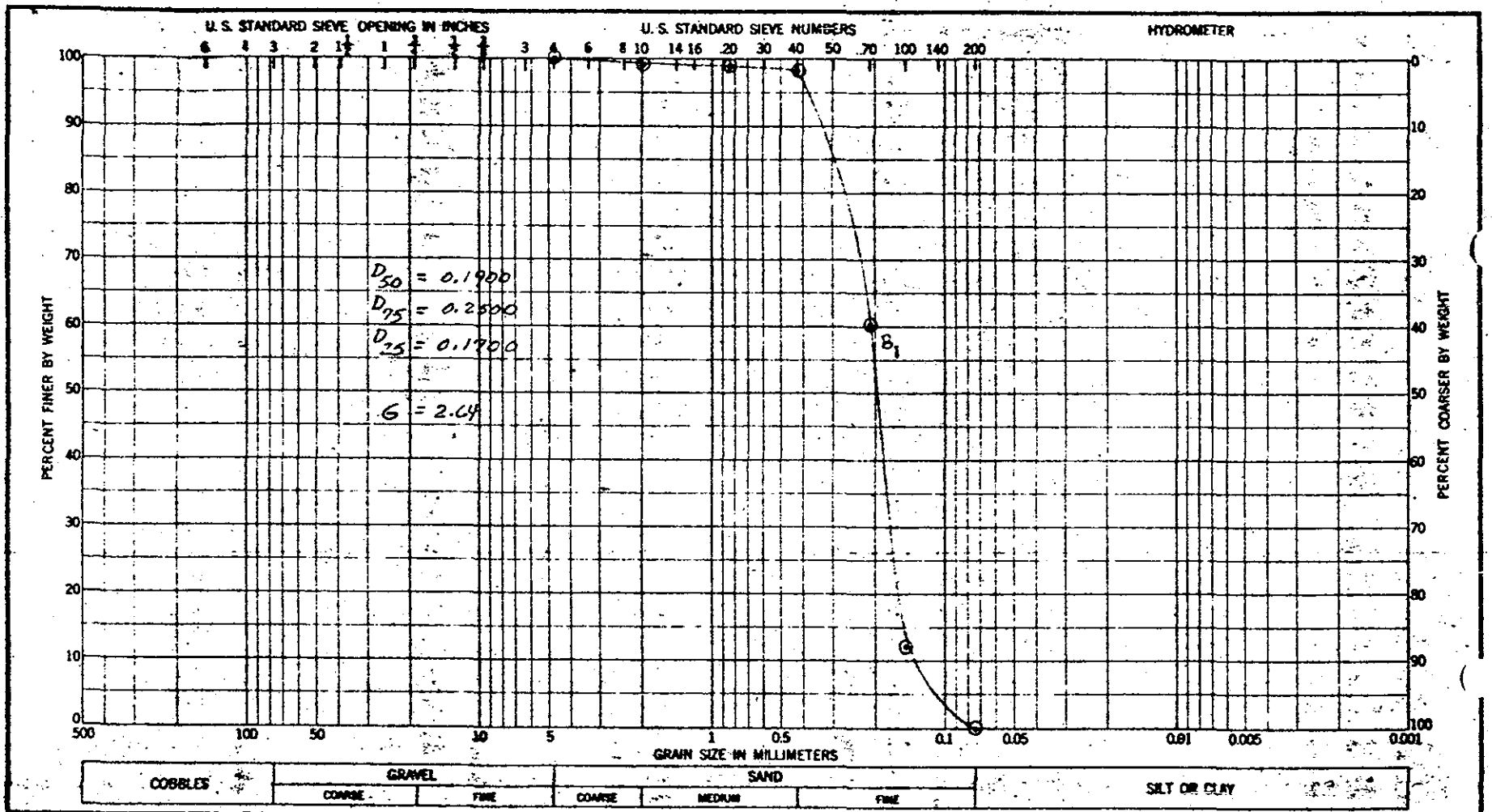


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
B1	Surface	Fine SAND (SP)				

GRADATION CURVES

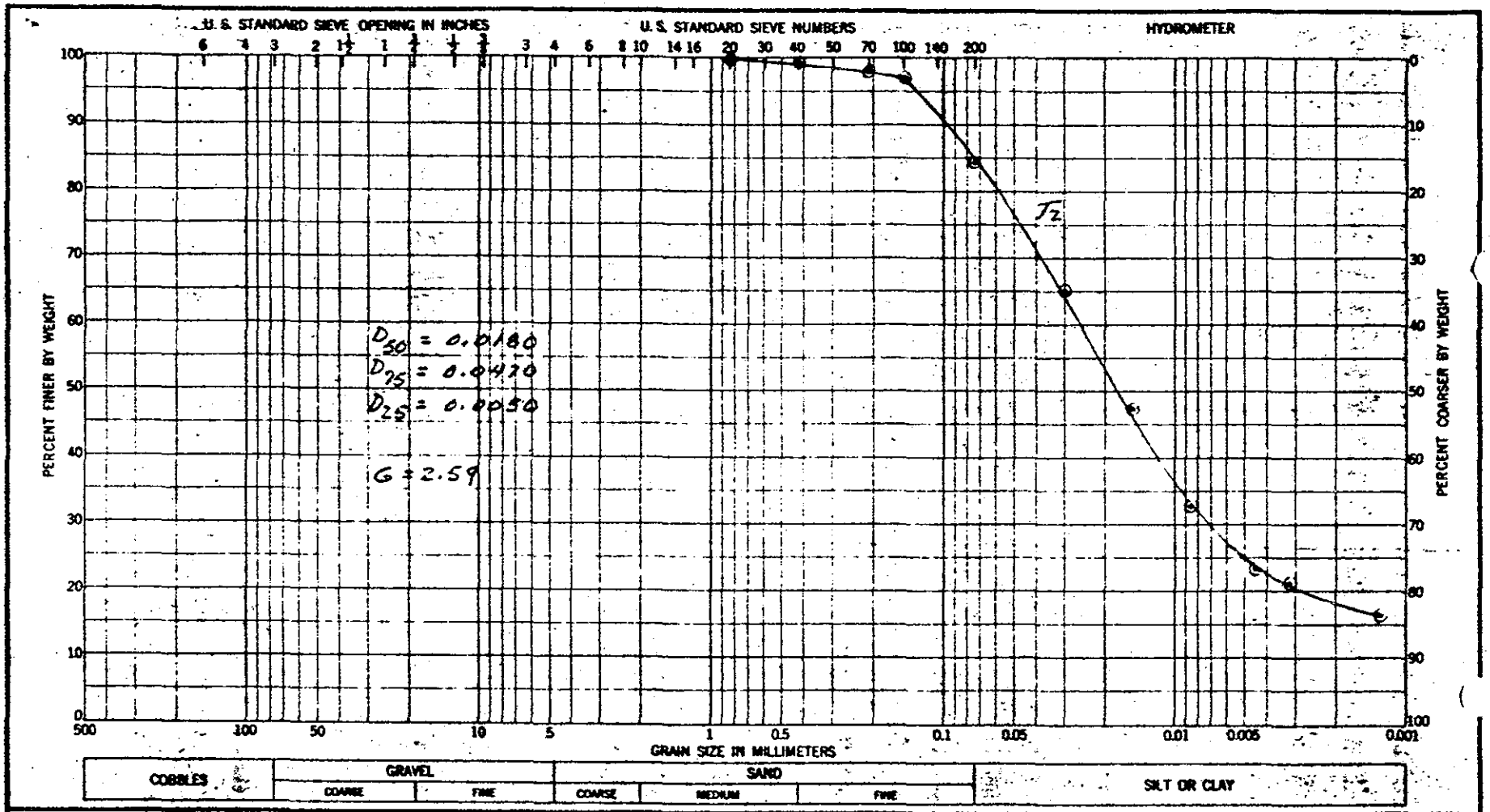
Project: CuHyhunk Harbor, Mass.

Area:

Boring No.: GE-2 (Lab. Ser No 100-224-3)

Date: May 1976

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
Tz	6.0'-6.7'	fine sandy ORGANIC SILT (OH)	**	80 (61)	43 (42)	37 (19)

** Test performed on oven-dried soil

GRADATION CURVES

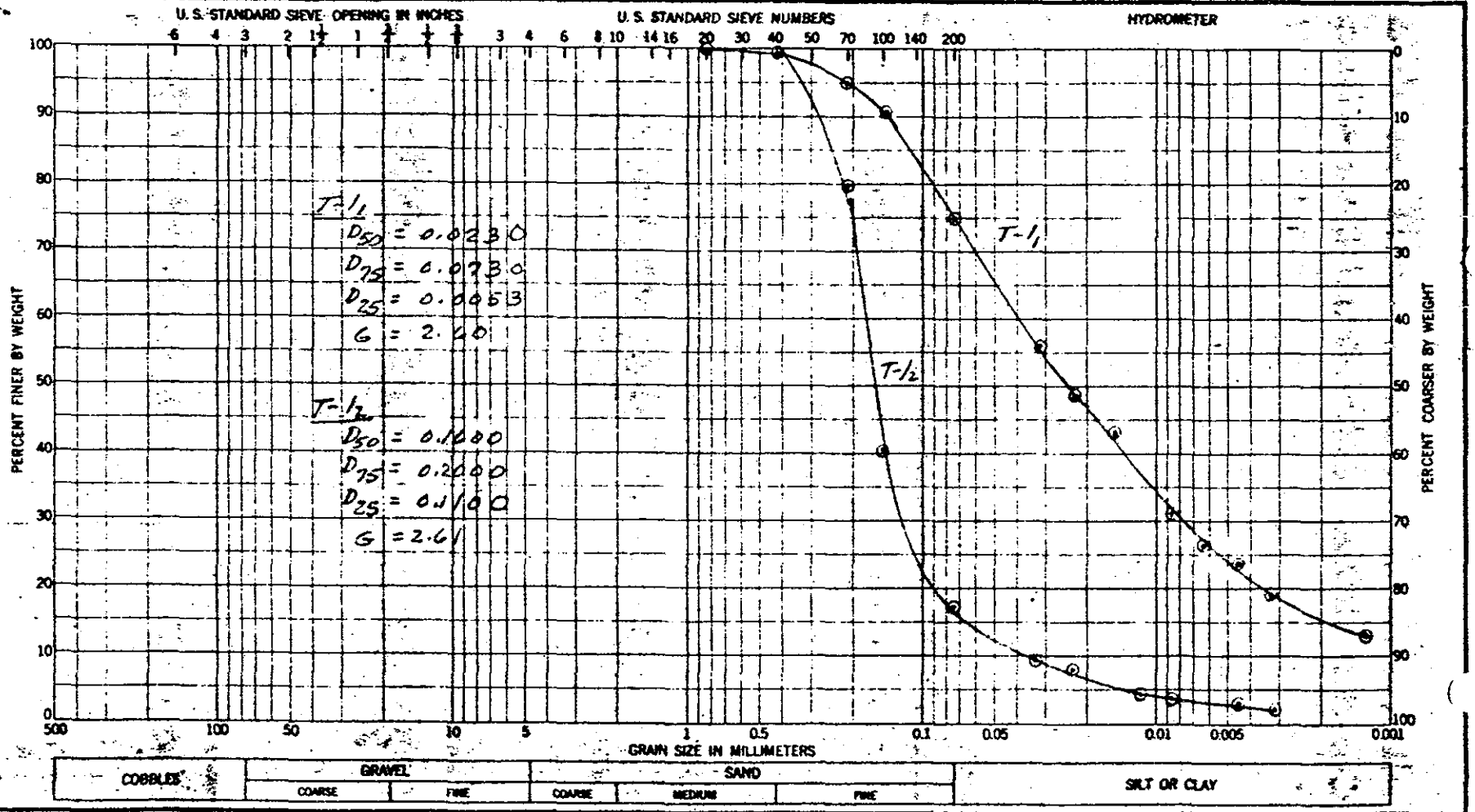
Project Cuttyhunk Harbor, Mass.

Area

Boring No. PE-6 (Lab Ser No 100-224-10)

Date May 1976

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
T-1₁	0.0'-1.0'	Fine sandy ORGANIC SILT (OH)		68	38	30
T-1₂	1.0-1.5'	silty fine SAND (SM)		NP	NP	NP

GRADATION CURVES

Project: Cuttyhunk Harbor, Mass

Area:

Boring No. PE-5 (Lab Ser No 100-224-B)

Date: May 1976

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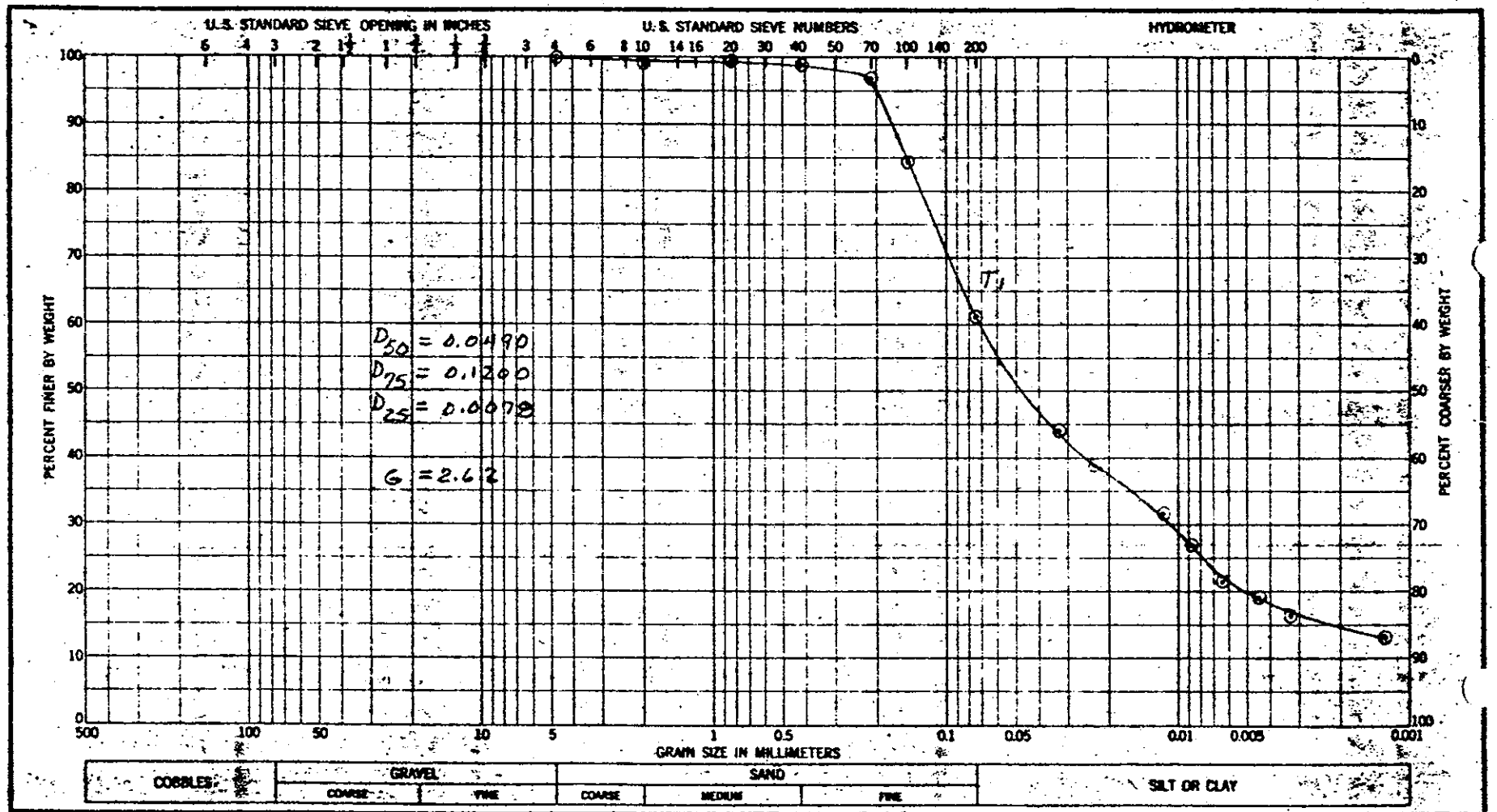


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
T1	0.0'- 0.73'	fine sandy ORGANIC SILT (OH)		58	35	23

GRADATION CURVES

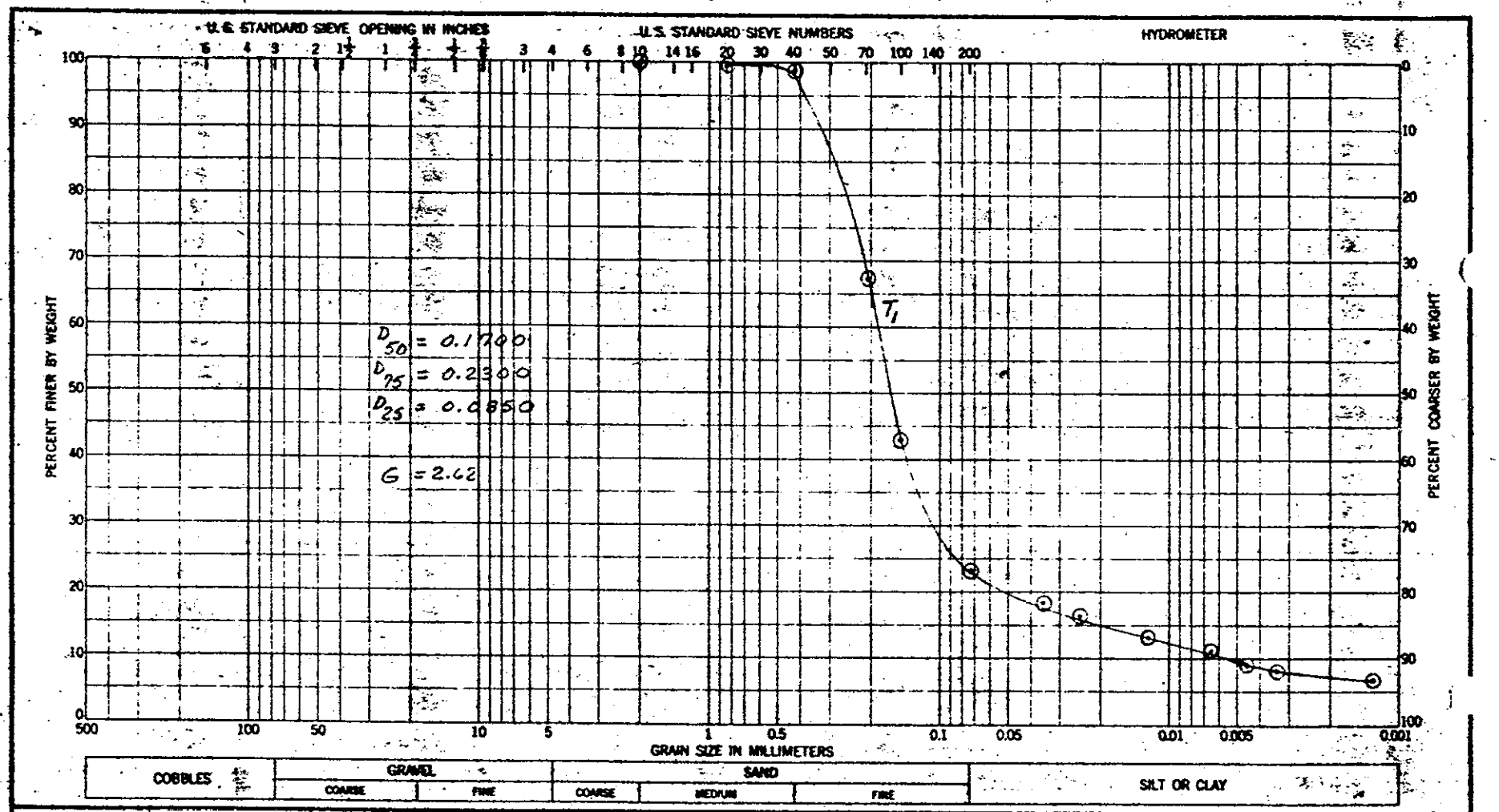
Project Cuttyhunk Harbor, Mass.

Area

Boring No. PE-4 (Lab Ser No 100-224-5)

Date May 1976

ENG FORM 2087 MAY 68



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
T_1	0.17'-1.0'	silty Fine SAND (SM)				

GRADATION CURVES

Project: Cuttyhunk Harbor, Mass.

Area:

Boring No. PE-1 (Lot. Ser. No. 100-224-1)

Date: May 1976

ENG FORM 1 MAY 69 2087